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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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Masayuki Ojima

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EXAMINER

GAMINO, CARLOS J

ART UNIT

PAPER NUMBER

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PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/500,802	Applicant(s) OJIMA ET AL.	
	Examiner CARLOS GAMINO	Art Unit 1793	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 22 December 2008.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 9-12, 14-20 and 24-29 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 9-12, 14-20 and 24-29 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Objections Claim

1. **Claim 24** is objected to because of the following informalities: the word "selected" needs to be added between "being" and "such" to correct the awkwardness of the claim language. Appropriate correction is required.

Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3. **Claims 9, 10, 12, 14-16, and 20** are rejected under 35 U.S.C. 102(b) as being anticipated by applicant's admitted prior art (AAPA).

Regarding claim 1, AAPA states that flow soldering and wave soldering are known in the art and that they connect parts to printed circuit boards; page 1, lines 12-25. It is also known that P, oxidation suppressing element (OSE), is consumed at a faster rate than the other alloying elements in the solder bath; page 2. It is also known to add the same solder alloy containing P to replenish a solder bath of the same alloy; page 4, lines 1-5. The examiner acknowledges that this does not necessarily return the amount of P to the desired level however this is not required by the claim. Nor does the claim specifically state what exactly is meant by preparing a solder bath or when the

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initial composition is determined. Having an initial composition is not the same as filling an empty solder bath which has the initial composition of the solder alloy used to fill it. Preparing a solder bath could be turning up the heat, starting or adjusting the wave machine, turning on a gas shroud, etc. Therefore the initial composition could be sometime after the solder bath has been idling between numerous soldering operations at which point the solder bath would have a lower level of molten solder alloy and inherently less P as taught by AAPA. At this point replenishing the solder bath with the same solder alloy as stated above would be "replenishing the solder bath with a replenishment solder alloy having a higher concentration of the oxidation suppressing element than does the initial composition of the solder bath."

Regarding claim 10, AAPA discloses it is known to add the same solder alloy containing an OSE to replenish a solder bath of the same alloy; page 4, lines 1-5.

Regarding claim 12, repeatedly replenishing the solder bath as described above will inherently at some point lead to a situation where the replenishment solder alloy has a concentration of 2-6 times the initial concentration because the OSE is being consumed faster than all the other alloys.

Regarding claims 14 and 15, AAPA states that these are known methods of soldering.

Regarding claim 16, AAPA states that it known to use P as an OSE.

Regarding claim 20, AAPA states that the amount of OSE that is consumed is replaced at the rate of everyday or 2-4 times a month.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims rejected under 35 U.S.C. 103(a) as being unpatentable over AAPA. This rejection is an alternative rejection to the 102 based on AAPA.

Regarding claim 9, AAPA teaches that the amount of P in a solder bath is replenished (which implies that the initial concentration is known) by charging a small amount of solder with a high concentration of P and the level of the solder bath is replenished by adding a solder alloy not containing P; page 3, lines 17-29.

What AAPA does not teach is that the replenishment solder has a higher level of OSE than the initial solder. The applicant is basically taking the two different replenishment steps and combining them into one step by adding the high P solder to the non P solder alloy. This claim would have been obvious because all the claimed elements were known in the prior art and one skilled in the art at the time of the invention could have combined the elements as claimed by known methods with no change in their respective functions, and the combination would have yielded predictable results to one of ordinary skill in the art at the time of the invention. One would have been motivated to combine these adding steps into one adding step by

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combining the alloys in order to save time, reduce inventory, and to simplify the process.

“It is prima facie obvious to combine two compositions each of which is taught by the prior art to be useful for the same purpose, in order to form a third composition to be used for the very same purpose.... [T]he idea of combining them flows logically from their having been individually taught in the prior art.” In re Kerkhoven, 626 F.2d 846, 850, 205 USPQ 1069, 1072 (CCPA 1980) (citations omitted) (Claims to a process of preparing a spray-dried detergent by mixing together two conventional spray-dried detergents were held to be prima facie obvious.). See also In re Crockett, 279 F.2d 274, 126 USPQ 186 (CCPA 1960) (Claims directed to a method and material for treating cast iron using a mixture comprising calcium carbide and magnesium oxide were held unpatentable over prior art disclosures that the aforementioned components individually promote the formation of a nodular structure in cast iron.); and Ex parte Quadranti, 25 USPQ2d 1071 (Bd. Pat. App. & Inter. 1992) (mixture of two known herbicides held prima facie obvious).

Regarding claim 10, AAPA does teach that it is known to add the same solder alloy as the initial composition; page 4, lines 1-5. However, AAPA does not teach that the same solder alloy is the same as the initial bath except for a different OSE content. It would have been obvious to one of ordinary skill in the art at the time of the invention that if all of the alloying elements were depleted equally, then in order to return to the initial composition of the bath, the added solder alloy couldn't vary in composition from the initial solder bath, except for the OSE, without changing the composition of the bath.

Regarding claim 12, the concentration required to replenish the soldering bath is an intrinsic step in this process. It would have been obvious to one of ordinary skill in the art at the time of the invention to use whatever amount of OSE was necessary to replenish the bath whether it is less than 2-6 times the initial concentration or more.

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Regarding claims 14 and 15, AAPA states that these are known methods of soldering.

Regarding claim 16, AAPA states that it known to use P as an OSE.

Regarding claim 20, AAPA states that the amount of OSE that is consumed is replaced at the rate of everyday or 2-4 times a month.

Regarding claim 24, in addition to the above 103 rejection of claim 9 the following applies.

AAPA teaches that the solder bath is initially formed with P in it. When the solder bath gets low the initial solder is added along with a high P alloy to replenish the bath; page 4, lines 1-11.

Therefore, a first soldering step is performed and the bath is refilled. Before the high P alloy is added it is inherent, without relying on blind luck, that the amount of P missing has to be determined in order to add the appropriate amount, thus the rate is determined. It would have been obvious to one of ordinary skill in the art at the time of the invention that this process would have been done at least once in order to determine how much P is used. By doing this it would have been obvious to one of ordinary skill in the art at the time of the invention that the next time the bath needs replenished the same exact amount and if all other variables in the process were held constant, the same exact amount of high P alloy and initial solder could be added without having to bother with the determining step. This claim would have been obvious because all the claimed elements were known in the prior art and one skilled in the art at the time of the invention could have combined the elements as claimed by known

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methods with no change in their respective functions, and the combination would have yielded predictable results to one of ordinary skill in the art at the time of the invention. One would have been motivated to combine these adding steps into one adding step by combining the alloys in order to save time, reduce inventory, and to simplify the process.

“It is prima facie obvious to combine two compositions each of which is taught by the prior art to be useful for the same purpose, in order to form a third composition to be used for the very same purpose.... [T]he idea of combining them flows logically from their having been individually taught in the prior art.” In re Kerkhoven, 626 F.2d 846, 850, 205 USPQ 1069, 1072 (CCPA 1980) (citations omitted) (Claims to a process of preparing a spray-dried detergent by mixing together two conventional spray-dried detergents were held to be prima facie obvious.). See also In re Crockett, 279 F.2d 274, 126 USPQ 186 (CCPA 1960) (Claims directed to a method and material for treating cast iron using a mixture comprising calcium carbide and magnesium oxide were held unpatentable over prior art disclosures that the aforementioned components individually promote the formation of a nodular structure in cast iron.); and Ex parte Quadranti, 25 USPQ2d 1071 (Bd. Pat. App. & Inter. 1992) (mixture of two known herbicides held prima facie obvious).

Regarding claims 25 and 26, it is the examiners position that these equations are one of the obvious possible ways to calculate the concentration needed using known variables.

Regarding claims 27 and 28, the concentration required to replenish the soldering bath is an intrinsic step in this process. It would have been obvious to one of ordinary skill in the art at the time of the invention to use whatever amount of OSE was necessary to replenish the bath whether it is less than 2-6 times the initial concentration (60-100 ppm) or more. This concentration would depend on variables such as how often the bath was replenished or the initial composition.

Regarding claim 29, it would have been obvious to one of ordinary skill in the art at the time of the invention that by determining the amount of P depleted over several time intervals, such as days, would allow one to average out any unusually high or low measurement that may have resulted from an unseen variable. In other words, only doing it over one time interval, such as one day, one runs the risk of skewed data and not knowing the data obtained was skewed would lead to adding too much or too little P.

6. **Claims 11 and 17-19** are rejected under 35 U.S.C. 103(a) as being unpatentable over AAPA as applied to claim 9 above, and further in view of further in view of Steen et al. (WO 01/03878 A1) and Kim (KR 2001107354 A).

In regards to the AAPA 102 rejection, what AAPA does not teach is a replenishment solder alloy comprising a composition in mass % of Ag: 2.5-3.5%, Cu: 0.2-0.9%, 60-100 ppm by mass of P (0.006-.01%) and the remainder Sn.

Steen teaches a solder alloy comprising used in wave soldering comprising a composition in wt% (same as mass %) of Sn to which is/are added one or more of Ag in an amount of up to 10%, Cu in an amount of up to 5%, Sb in an amount of up to 10% and Bi in an amount of up to 10%, which alloy additionally contains phosphorus in an amount of up to 0.01%. The P reduces the amount of oxide and dross formed; abstract and page 1, lines 21-22.

Kim teaches a solder alloy comprising a composition in wt% of , 0.1-7.0% Cu, 0.5-5.0% Ag, 0.0001-3.0% P and the remainder Sn. The P blocks the air from reacting with the liquid solder; abstract.

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Both solder alloys listed above read on the claimed alloy and it would have been obvious to one of ordinary skill in the art at the time of the invention to have initially used either solder composition in a wave soldering method to prevent the metals in the solder bath from forming oxides and to have kept replenishing the solder bath with them as AAPA teaches it was known to do in the art.

In regards to the AAPA 103 rejection, what AAPA does not teach is a SN-Cu-Ag-P soldering alloy with the claimed composition.

Steen and Kim both teach a Sn-Cu-Ag-P soldering alloy that fully encompasses the claimed ranges.

It would have been obvious to one of ordinary skill in the art at the time of the invention to use either of these solder alloys to replenish a solder bath if the concentration of P needed could be provided by them.

Steen, Kim and the claims differ in that Steen and Kim do not teach the exact same ranges as recited in the instant claims.

However, one of ordinary skill in the art at the time the invention was made would have considered the invention to have been obvious because the compositional ranges taught by Steen and Kim overlap the instantly claimed proportions and therefore are considered to establish a prima facie case of obviousness. It would have been obvious to one of ordinary skill in the art to select any portion of the disclosed ranges including the instantly claimed ranges from the ranges disclosed in the prior art reference, particularly in view of the fact that;

“The normal desire of scientists or artisans to improve upon what is already generally known provides the

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motivation to determine where in a disclosed set of percentage ranges is the optimum combination of percentages”, In re Peterson 65 USPQ2d 1379 (CAFC 2003).

Also, In re Geisler 43 USPQ2d 1365 (Fed. Cir. 1997); In re Woodruff, 16 USPQ2d 1934 (CCPA 1976); In re Malagari, 182 USPQ 549, 553 (CCPA 1974) and MPEP 2144.05.

Response to Arguments

7. Applicant’s amendment to include the limitation of "having an initial composition" and “initial composition of the” have necessitated the new rejections of claims 9-12 and 14-20.

8. Applicant's arguments filed 12/22/08 have been fully considered but they are not persuasive.

9. The applicant argues that the information on pages 1-4 is not prior art. The examiner disagrees. The information is under the heading "Background Art" and included with the pages where the examiner has used this information in the rejection are phrases such as, "in the prior art", "in the past" and “it was thought”. Therefore, this information is considered prior art.

10. The applicant argues that none of the prior art methods is a method “including replenishing a solder bath with a replenishment solder alloy having a higher concentration of an oxidation suppressing element than does the initial composition of the solder bath.” The examiner disagrees because the term “initial” does not limit the claim to when the initial composition is determined. Having an initial composition is not the same as filling an empty solder bath which has the initial composition of the solder

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alloy used to fill it. Therefore the prior does read upon these limitations as shown above.

11. The applicant argues that Nishimura can not be combined with AAPA to result in the method claimed in the amended claims 9 and 11. Nishimura is not used in the current rejection so this argument is moot.

12. The applicant argues that Steen and Kim merely teach soldering alloys and using them in a soldering bath would not result in the method of amended claim 9. The examiner disagrees. Due to the lack of information concerning the "preparing" and when the "initial" concentration is measured, the use of Steen or Kim in a soldering bath would result in the claimed method. Furthermore, these references are used to teach that the claimed composition is not novel.

13. The applicant argues that pages 1-4, AAPA, do not suggest or disclose the methods claimed in the amended claim 9 or new claim 24. The examiner disagrees and has shown how the AAPA does suggest and disclose amended claim 9 and how AAPA does suggest claim 24.

Conclusion

14. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

15. Any inquiry concerning this communication or earlier communications from the examiner should be directed to CARLOS GAMINO whose telephone number is (571) 270-5826. The examiner can normally be reached on Monday-Thursday, 8:30am-7:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jessica L. Ward can be reached on (571) 272-1223. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

CG

/Kiley Stoner/
Primary Examiner, Art Unit 1793